Statement of Basis

Permit to Construct No. P-2016.0037
Project ID 61740

Burley City of (City of Burley IWTP)
Burley, Idaho

Facility ID 067-00022

Final

April 11, 2017
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Senior Air Quality Engineer

The purpose of this Statement of Basis is to satisfy the requirements of IDAPA 58.01.01.et seq, Rules for the Control of Air Pollution in Idaho, for issuing air permits.

ACRONYMS, UNITS, AND CHEMICAL NOMENCLATURE

AAC	acceptable ambient concentrations
AACC	acceptable ambient concentrations for carcinogens
acfm	actual cubic feet per minute
ASTM	American Society for Testing and Materials
BACT	Best Available Control Technology
BMP	best management practices
Btu	British thermal units
BVF	Bulk Volume Fermenter
CAA	Clean Air Act
CAM	Compliance Assurance Monitoring
CAS No.	Chemical Abstracts Service registry number
CBP	concrete batch plant
CEMS	continuous emission monitoring systems
cfm	cubic feet per minute
CFR	Code of Federal Regulations
CI	compression ignition
CMS	continuous monitoring systems
CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	CO_2 equivalent emissions
COMS	continuous opacity monitoring systems
DEQ	Department of Environmental Quality
dscf	dry standard cubic feet
EL	screening emission levels
EPA	U.S. Environmental Protection Agency
FEC	Facility Emissions Cap
GHG	greenhouse gases
gph	gallons per hour
gpm	gallons per minute
gr	grains (1 lb = 7,000 grains)
H_2S	hydrogen sulfide
HAP	hazardous air pollutants
HHV	higher heating value
HMA	hot mix asphalt
hp	horsepower
hr/yr	hours per consecutive 12 calendar month period
ICE	internal combustion engines
IDAPA	a numbering designation for all administrative rules in Idaho promulgated in accordance with the Idaho Administrative Procedures Act
iwg	inches of water gauge
km	kilometers
lb/hr	pounds per hour
lb/qtr	pound per quarter
m	meters
MACT	Maximum Achievable Control Technology
mg/dscm	milligrams per dry standard cubic meter
MMBtu	million British thermal units
MMscf	million standard cubic feet
NAAQS	National Ambient Air Quality Standard
NESHAP	National Emission Standards for Hazardous Air Pollutants
NO_2	nitrogen dioxide

NO_X	nitrogen oxides
NSPS	New Source Performance Standards
O&M	operation and maintenance
O_2	oxygen
PAH	polyaromatic hydrocarbons
PC	permit condition
PCB	polychlorinated biphenyl
PERF	Portable Equipment Relocation Form
PM	particulate matter
$PM_{2.5}$	particulate matter with an aerodynamic diameter less than or equal to a nominal 2.5 micrometers
PM_{10}	particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers
POM	polycyclic organic matter
ppm	parts per million
ppmw	parts per million by weight
PSD	Prevention of Significant Deterioration
psig	pounds per square inch gauge
PTC	permit to construct
PTC/T2	permit to construct and Tier II operating permit
PTE	potential to emit
PW	process weight rate
RAP	recycled asphalt pavement
RFO	reprocessed fuel oil
RICE	reciprocating internal combustion engines
Rules	*Rules for the Control of Air Pollution in Idaho*
scf	standard cubic feet
SCL	significant contribution limits
SIP	State Implementation Plan
SM	synthetic minor
SM80	synthetic minor facility with emissions greater than or equal to 80% of a major source threshold
SO_2	sulfur dioxide
SO_x	sulfur oxides
T/day	tons per calendar day
T/hr	tons per hour
T/yr	tons per consecutive 12 calendar month period
T2	Tier II operating permit
TAP	toxic air pollutants
TEQ	toxicity equivalent
T-RACT	Toxic Air Pollutant Reasonably Available Control Technology
ULSD	ultra-low sulfur diesel
U.S.C.	United States Code
VOC	volatile organic compounds
yd^3	cubic yards
$\mu g/m^3$	micrograms per cubic meter

FACILITY INFORMATION

Description

The City of Burley operates the ADI Bulk Volume Fermenter (BVF) anaerobic digester facility located at the Burley/Heyburn Industrial Park, 999 West Railroad Ave, Burley, ID 83318. Currently, the city uses the digester to treat pretreated wastewater from a cheese producer, dry milk products producer, and potato products producer. Pretreated wastewater is retained and biologically degraded in the digester. The biogas byproducts created include methane (CH_4), carbon dioxide (CO_2), and hydrogen sulfide (H_2S). All biogas byproducts are collected from under the cover of the digester and burned by the flare system. The flare system consists of one flare.

Permitting History

The following information was derived from a review of the permit files available to DEQ. Permit status is noted as active and in effect (A) or superseded (S).

January 6, 2006	P-040412, City of Burley acquired the ADI-BVT digester from the former J.R. Simplot potato plant. Permit status (A, but will become S upon issuance of this permit)

Application Scope

This PTC is for a minor modification at an existing minor facility. The applicant has proposed to treat new dischargers in the digester and to continuously comply with the same SO_2 emissions limit.

Application Chronology

April 13, 2016	DEQ received application fee.
June 24, 2016	DEQ received an application.
July 12, 2016	DEQ determined that the application was incomplete.
November 10, 2017	DEQ received supplemental information from the applicant.
December 8, 2016	DEQ determined that the application was complete.
January 19, 2017	DEQ made available the draft permit and statement of basis for peer and regional office review.
February 3, 2017	DEQ made available the draft permit and statement of basis for applicant review.
February 13, 2017	DEQ received the permit processing fee.
April 11, 2017	DEQ issued the final permit and statement of basis.

TECHNICAL ANALYSIS

Emissions Units and Control Equipment

Table 1 EMISSIONS UNIT AND CONTROL EQUIPMENT INFORMATION

Source ID No.	Sources	Control Equipment	Emission Point ID No.
1	ADI-BVF Anaerobic Digester Flare: Manufacturer: ADI Model: ADI-BVF Rated heat input rating: 37.5 MMBtu/hr Max. design biogas flow: 1,000,000 scf/day	None	Exit height: 37.5 ft Exit diameter: 3.5 ft Exit flow velocity: 65.5 feet per second Exit temperature: ~1,832 °F

Emissions Inventories

Potential to Emit

IDAPA 58.01.01 defines Potential to Emit as the maximum capacity of a facility or stationary source to emit an air pollutant under its physical and operational design. Any physical or operational limitation on the capacity of the facility or source to emit an air pollutant, including air pollution control equipment and restrictions on hours of operation or on the type or amount of material combusted, stored or processed, shall be treated as part of its design if the limitation or the effect it would have on emissions is state or federally enforceable. Secondary emissions do not count in determining the potential to emit of a facility or stationary source.

Using this definition of Potential to Emit, an emission inventory was developed by the applicant and reviewed by DEQ staff.

Table 2 POST PROJECT POTENTIAL TO EMIT FOR REGULATED AIR POLLUTANTS

Source	PM_{10}	$PM_{2.5}$	SO_2	NO_X	CO	VOC
Flare (T/yr)	1.2	1.2	86.4[1]	15.6	13	0.85

[1] based on the information of current dischargers and the proposed annual biogas flowrate limit of 105,000,000 scf/yr. The applicant has requested to keep the existing emissions limit of 99 T/yr in the permit.

TAP Emissions

This permitting action does not authorize an increase in emissions. There is no TAP increment.

HAP Emissions

Uncontrolled HAP emissions from the flare are less than one ton per year.

Ambient Air Quality Impact Analyses

This permitting action does not authorize an increase in emissions; therefore ambient air quality impact analyses are not required.

REGULATORY ANALYSIS

Attainment Designation (40 CFR 81.313)

The facility is located in Cassia County, which is designated as attainment or unclassifiable for $PM_{2.5}$, PM_{10}, SO_2, NO_2, CO, and Ozone. Refer to 40 CFR 81.313 for additional information.

Facility Classification

This permitting action does not authorize an increase in emissions; therefore, the facility classification is unchanged. Refer to the SOB for PTC No. P-040412 issued January 6, 2006 for details. (2011AAG3030).

Permit to Construct (IDAPA 58.01.01.201)

IDAPA 58.01.01.201 ..... Permit to Construct Required

The permittee has requested that a PTC be issued to the facility for allowing new dischargers to the digester. Therefore, a permit to construct is required to be issued in accordance with IDAPA 58.01.01.220. This permitting action was processed in accordance with the procedures of IDAPA 58.01.01.200-228.

Title V Classification (IDAPA 58.01.01.300, 40 CFR Part 70)

IDAPA 58.01.01.301 ..... Requirement to Obtain Tier I Operating Permit

Post project facility-wide emissions from this facility do not have a potential to emit greater than 100 tons per year for all regulated air pollutants or 10 tons per year for any one HAP or 25 tons per year for all HAP combined. Therefore, the facility is not a Tier I source in accordance with IDAPA 58.01.01.006, and the requirements of

IDAPA 58.01.01.301 do not apply.

PSD Classification (40 CFR 52.21)

40 CFR 52.21 ..... Prevention of Significant Deterioration of Air Quality

The facility is not a major stationary source as defined in 40 CFR 52.21(b)(1), nor is it undergoing any physical change at a stationary source not otherwise qualifying under paragraph 40 CFR 52.21(b)(1) as a major stationary source, that would constitute a major stationary source by itself as defined in 40 CFR 52. Therefore in accordance with 40 CFR 52.21(a)(2), PSD requirements are not applicable to this permitting action. The facility is not a designated facility as defined in 40 CFR 52.21(b)(1)(i)(a), and does not have facility-wide emissions of any criteria pollutant that exceed 250 T/yr.

NSPS Applicability (40 CFR 60)

40 CFR 60, Subpart O ..... Standards of Performance for Sewage Treatment Plants

§60.150 Applicability and designation of affected facility.

(a) The affected facility is each incinerator that combusts wastes containing more than 10 percent sewage sludge (dry basis) produced by municipal sewage treatment plants, or each incinerator that charges more than 1000 kg (2205 lb) per day municipal sewage sludge (dry basis).

(b) Any facility under paragraph (a) of this section that commences construction or modification after June 11, 1973, is subject to the requirements of this subpart.

Regulatory analysis: *This regulation does not apply to this facility because the incinerator at this facility only burns biogas and no municipal sewage sludge.*

NESHAP Applicability (40 CFR 61)

The facility is not subject to any NESHAP requirements in 40 CFR 61.

MACT Applicability (40 CFR 63)

40 CFR 63, Subpart VVV ..... National Emission Standards for Hazardous Air Pollutants: Publicly Owned Treatment Works

§63.1580 Am I subject to this subpart?

(a) You are subject to this subpart if the following are all true:

(1) You own or operate a publicly owned treatment works (POTW) that includes an affected source (§63.1595);

(2) The affected source is located at a POTW which is a major source of HAP emissions, or at any industrial POTW regardless of whether or not it is a major source of HAP; and

(3) Your POTW is required to develop and implement a pretreatment program as defined by 40 CFR 403.8 (for a POTW owned or operated by a municipality, State, or intermunicipal or interstate agency), or your POTW would meet the general criteria for development and implementation of a pretreatment program (for a POTW owned or operated by a department, agency, or instrumentality of the Federal government).

(b) If your existing POTW treatment plant is not located at a major source as of October 26, 1999, but thereafter becomes a major source for any reason other than reconstruction, then, for the purpose of this subpart, your POTW treatment plant would be considered an existing source. Note to Paragraph (b): See §63.2 of the national emission standards for hazardous air pollutants (NESHAP) General Provisions in subpart A of this part for the definitions of major source and area source.

(c) If you reconstruct your POTW treatment plant, then the requirements for a new or reconstructed POTW treatment plant, as defined in §63.1595, apply.

Regulatory analysis: *This subpart does not apply to the facility because it is not a major source of HAP emissions.*

Permit Conditions Review

This section describes only those permit conditions that have been added, revised, modified or deleted as a result of this permitting action.

Permit Conditions 1.1 and 1.3

Permit Condition 1.1 states the purpose of this permitting action. Permit Condition 1.3 states that this permit replaces PTC No. P-040412 issued on January 6, 2006.

Table 1.1

According the application, the facility now has one flare instead of two flares. The description of the flare system in Table 1.1 is revised to reflect the change.

Permit Condition 2.1

Permit Condition 2.1 has been revised to reflect that this revised PTC allows for new dischargers, such as dry milk products producer, potato products producers, that the facility only has one flare, and that the biogas contains less than 1% H_2S by volume as the SO_2 emissions estimation is based on that.

Permit Conditions 2.4 and 2.5

Since there is only one flare, "each of the flares" has been changed to "the flare" in Permit Condition 2.4, and "flare stacks" has been changed to "flare stack" in Permit Condition 2.5.

Permit Condition 2.10

The applicant has used the biogas flowrate of 105,000,000 scf/yr to calculate SO_2 PTE and to keep SO_2 emissions below the major source threshold. This biogas annual flowrate to the flare is established as a throughput limit in Permit Condition 2.10.

Permit Condition 2.11

"Within 60 days of issuance of this permit" is removed from the revised permit, as the permittee shall have already installed the device.

Permit Condition 2.12

Permit Condition 2.12 is a monitoring requirement to demonstrate compliance with the flare biogas annual throughput limit.

Permit Condition 2.13

Because the revised PTC allows new dischargers, the permittee is required to maintain a list of dischargers on-site and to make it available to DEQ on request. The list should contain the date each discharger began discharging pre-treated wastewater to the digester.

Permit Condition 2.14

"New cheese plant" is replaced with "new discharger" as the revised permit allows the digester to take pretreated wastewater from other dischargers, such as milk products producer.

"Within 30 days" reporting time is changed to "Within 60 days" due to the change of Air Rules.

Mailing address of Twin Falls Regional Office is updated to reflect the new office location.

First paragraph of PC 2.14.3 - "The permittee shall provide notice of intent to test to DEQ at least 15 days prior to the scheduled test or shorter time period as provided in a permit, order, consent decree, or by DEQ approval. DEQ may, at its option, have an observer present at any emissions tests conducted on a source. DEQ requests such testing not be performed on weekends or state holidays." is removed as it is in PC 3.7 of General Provisions.

Permit Condition 2.15

"80 tons per year" and "80% of the major source threshold" is replaced with "90 tons per year" and "90% of the major source threshold".

With the new flare throughput limit and the recently verified H_2S concentration (i.e., <1%) in the biogas, using 90 tons or 90% of the major source threshold as a safeguard to prevent the facility from becoming Title V major source becomes reasonable.

Permit Condition 2.16

"Within 60 days of issuance of this permit" is removed from the revised permit, as the permittee shall have already developed the O&M manual.

"A copy of the manual shall be submitted to DEQ's Twin Falls Regional Office at the following address whenever the manual is developed and/or revised…" is removed. Keeping it on site at all times and making it available to DEQ representatives upon request is sufficient.

Permit Condition 2.17

The permittee is required to notify DEQ each time a new discharger begins to discharge to the digester within five working days after occurrence. Five-day timeframe is consistent with the timeframe in General Provisions PC 3.6.

General Provisions

General Provisions are updated using the current PTC template.

PUBLIC REVIEW

Public Comment Opportunity

Because this permitting action does not authorize an increase in emissions, an opportunity for public comment period was not required or provided in accordance with IDAPA 58.01.01.209.04.

APPENDIX A – EMISSIONS INVENTORIES

(Taken from the applicant's 11/10/2016 submittal, p.2-14, 2016AAG2414)

Appendix A.
Criteria Air Pollutant Emissions from Biogas Combustion

Tables 1 and 2 below summarize the hourly and annual emission estimates for criteria pollutants for current operations from the City of Burley IWTP. Calculations of these estimates and the assumptions made in performing the calculations are described below.

Table 1 Estimated Hourly Criteria Pollutant Emissions – City of Burley IWTP

Emissions Unit	Stack or Emissions Point ID[a]	PM_{10}	$PM_{2.5}$		SO_2		NO_x		CO		VOC	
		lb/hr 24-hr Avg.	lb/hr 24-hr Avg.	lb/hr Year. Avg.	lb/hr Max.	lb/hr 3-hr Avg.	lb/hr Max.	lb/hr Year. Avg.	lb/hr Max.	lb/hr 8-hr Avg.	lb/hr 24-hr. Avg.	lb/hr Year Avg.
Biogas Comb.	Flare	0.27	0.27	0.27	19.8	19.8	3.6	3.6	3.0	3.0	0.19	0.19
Total Emissions		0.27	0.27	0.27	19.8	19.8	3.6	3.6	3.0	3.0	0.19	0.19

Table 2. ANNUAL POTENTIAL TO EMIT FOR CRITERIA POLLUTANTS

Emissions Unit	PM_{10}	$PM_{2.5}$	SO_2	NO_X	CO	VOC
	Ton/year	Ton/year	Ton/year	Ton/year	Ton/year	Ton/year
Point Sources						
Flare	1.2	1.2	86.4	15.6	13.0	0.85

Biogas Combustion Assumptions

One flare is currently in operation burning biogas at the Burley IWTP. The flare has a rated heat input of 37.5 MMBtu/hour. The flare is located to the east of the digester and biogas from the digester is compressed and piped to the flare. The flare is 37.5 feet in height and has a diameter of 3.5 feet. It is approximately 424 meters from the nearest off –site receptor (Snake River Marina). Available information on the biogas indicated that it contains a maximum of 60% methane (CH_4) and 1% hydrogen sulfide (H_2S) with the balance being carbon dioxide (CO_2). The maximum design flow of biogas to the flare is 1,000,000scf/day.

Based upon a request from the Idaho DEQ, RMEC collected two samples of the biogas from a sampling port on exit side of the biogas blower to verify the methane and H_2S content in the biogas. The biogas at this sample point had a discharge pressure less than 1 psi with blower running at 33.3% of max speed. For each sample, an evacuated 6 liter summa canister was connected to the sample point using nylon tubing and Swagelok fittings. The blowers where then started and the valves on the sample port and on the summa canister were opened allowing biogas to enter the canister. Once filled, the valve on the summa canister was closed. Vacuum pressures in the canister were checked

before and after sample collection to verify a proper sample was collected. The biogas samples were analyzed for H_2S using ASTM Method D5504 and for methane using GC-FID by ALS Laboratories of Salt Lake City. The laboratory report from the sample analysis are attached. The average H_2S concentration in the biogas was found to be 0.97% (essentially 1%) and the average methane concentration was found to be 85%. These revised H_2S and methane concentrations were used to perform the emission calculations below.

The Burley IWTP has a flow meter that measures and records biogas flow to the flare. This meter is located in the blower room downstream from the blower motors. Data provided by the City of Burley indicated that 69,482,139 standard cubic feet (scf) of biogas was produced by the ADI-BVF Digester in calendar year 2015 and burned by the flare. The biogas production to date for calendar year 2016 indicates that less than 50,000,000 scf of biogas will be produced and burned by the flare in 2016. The original design specifications for the digester/flare indicated that the maximum biogas generation rate for the system was 1,000,000 sfc/day (365,000,000 scf/year). The statement of basis for the original air permit for the digester/flare indicated the maximum biogas generation rate was 1,500,000 sfc/day (547,500,000 scf/year). RMEC does not know why this discrepancy exists. In any case, as can be seen from these data from the most recent calendar year, the digester/flare are operating well below maximum design conditions.

With the exception of SO_2, the calculation of PTE criteria and HAP emissions in this emission inventory assumed that that the maximum design biogas flow of 1,000,000 scf/day for 365 days/year was combusted the flare. As previously indicated this is a high end estimate as actual biogas flows to the flare have been shown to be considerably less than the maximum design flow. To provide a reasonable estimate of current and future SO_2 emissions from biogas combustion at the Burley IWTP, RMEC will assume that biogas will be produced at a rate of 105,000,000 scf/year. This volume of biogas is slightly more than 1.5 times the actual measured 2015 biogas production.

Maximum PM_{10} PTE Estimates from Biogas Combustion

(1 x 10^6 scf biogas/day) x (0.85 methane content) x (7.6 lbs. $PM_{10}/10^6$ scf biogas) x (365 day/year) x (1 ton/2000lbs.) =
1.2 tons PM_{10}/year
2400 lbs. PM_{10}/year x 1 year/8760 hours =
0.27 lbs. PM_{10}/hour

Maximum $PM_{2.5}$ PTE Estimates from Biogas Combustion

AP-42 lists a total particulate matter (PM) emission factor for natural gas consumption of 7.6 lbs. per 10^6 scf of gas. AP-42 states that all of this particulate matter is less than 1 micron in diameter so this same emission factor can be applied to estimate PM_{10}, $PM_{2.5}$, or $PM_{1.0}$ from natural gas (biogas) combustion.

(1 x 10^6 scf biogas/day) x (0.85 methane content) x (7.6 lbs. $PM_{2.5}/10^6$ scf biogas) x (365 day/year) x (1 ton/2000lbs.) =
1.2 tons $PM_{2.5}$/year

2400 lbs. PM_{10}/year x 1 year/8760 hours =
0.27 lbs. $PM_{2.5}$/hour

Maximum CO PTE Estimates from Biogas Combustion

AP-42 lists a carbon monoxide (CO) emission factor for natural gas consumption of 84 lbs. per 10^6 scf of gas.

(1 x 10^6 scf biogas/day) x (0.85 methane content) x (84 lbs. CO/10^6 scf biogas) x (365 day/year) x (1 ton/2000 lbs.) =
13.0 tons CO/year

26,000 lbs. CO_0/year x 1 year/8760 hours =
3.0 lbs. CO/hour

Maximum NO_x PTE Estimates from Biogas Combustion

AP-42 lists a nitrogen oxide (NOx) emission factor for natural gas consumption of 100 lbs. per 10^6 scf of gas.

(1 x 10^6 scf biogas/day) x (0.85 methane content) x (100 lbs. NO_x/10^6 scf biogas) x (365 day/year) x (1 ton/2000 lbs.) =
15.6 tons NO_x/year

31,200 lbs. PM_{10}/year x 1 year/8760 hours =
3.6 lbs. NO_x /hour

Maximum VOC PTE Estimates from Biogas Combustion

AP-42 lists a volatile organic compound (VOC) emission factor for natural gas consumption of 5.5 lbs. per 10^6 scf of gas.

(1 x 10^6 scf biogas/day) x (0.85 methane content) x (5.5 lbs. VOC/10^6 scf biogas) x (365 day/year) x (1 ton/2000 lbs.) =
0.85 tons VOC/year

1700 lbs. VOC/year x 1 year/8760 hours =
0.19 lbs. VOC/hour

Maximum SO_2 PTE Estimates from Biogas (methane) Combustion

AP-42 lists a sulfur dioxide (SO_2) emission factor for natural gas consumption of 0.6 lbs. per 10^6 scf of gas.

(1 x 10^6 scf biogas/day) x (0.85 methane content) x (0.6 lbs. $SO_2/10^6$ scf biogas) x (365 day/year) x (1 ton/2000 lbs.) =
0.10 tons SO_2/year from biogas methane combustion

200 lbs. SO_2/year x 1 year/8760 hours =
0.02 lbs. SO_2/hour from biogas methane combustion

Maximum SO_2 PTE Estimates from Biogas (hydrogen sulfide) Combustion

(105,000,000 scf/year) x (0.01 H_2S content) x (28.3 liter/scf) x (1 mole/24.45 liter @NTP) x (0.8 conversion factor H_2S to SO_2) x (64 g/mole of SO_2) x (1 lb./454 g) x 1 ton/2000 lbs.) =

85.7 tons SO_2/year from biogas hydrogen sulfide combustion

171,400 lbs. SO_2/year x 1 year/8760 hours =
19.6 lbs. SO_2/hour from biogas methane combustion

Total Combined Maximum PTE Estimates from Biogas (methane + hydrogen sulfide) Combustion

(0.07 tons/year from methane combustion) + (85.7 tons/year from H_2S combustion) =
86.4 tons SO_2/year
(0.02 lbs/hour from methane combustion) + (19.6 lbs./hour from H_2S combustion) =
19.8 lbs. SO_2/hour

Hazardous Air Pollutant Emissions from Biogas Combustion

Table 3 provides a maximum PTE emissions of Hazardous Air Pollutants from the combustion of biogas at the City of Burley IWTP. As can be seen in the table, the emission estimates assume that the maximum design flow of biogas to the flare (1,000,000scf/day for 365 days per year) was combusted in one year. This will greatly over-estimate the actual level of emissions as previous biogas production data has shown that the typical annual biogas production is approximately 70 x 10^6 scf and not 365 x 10^6 scf as assumed in the table. Hydrogen sulfide (H_2S) emissions were based on actual 2015 biogas production data (multiplied by a factor of 1.5) and assumed the biogas contained 1% H_2S, and also assumed that 20% of the H_2S was not combusted by the flare.

Table 3. HAP POTENTIAL TO EMIT EMISSIONS SUMMARY

Hazardous Air Pollutant	Annual Biogas Volume (10^6 scf/year)	Methane Content	AP-42 Emission Factor (lbs./10^6 scf of biogas)	Max PTE Emissions lbs./year	Max PTE Emissions tons/year
Benzene	365	0.85	0.0021	0.651525	0.000325763
Hexane	365	0.85	1.8	558.45	0.279225
Formaldehyde	365	0.85	0.077	23.88925	0.011944625
Toluene	365	0.85	0.0034	1.05485	0.000527425
Polycyclic Organic Matter	365	0.85	0.000088	0.027302	0.000013651
Arsenic	365	0.85	0.0002	0.06205	0.000031025
Beryllium	365	0.85	0.000012	0.003723	
Cadmium	365	0.85	0.0011	0.341275	0.000170638
Chromium	365	0.85	0.0014	0.43435	0.000217175
Cobalt	365	0.85	0.000088	0.027302	0.000013651
Manganese	365	0.85	0.00038	0.117895	5.89475E-05
Mercury	365	0.85	0.00026	0.080665	4.03325E-05
Nickel	365	0.85	0.0021	0.651525	0.000325763
Selenium	365	0.85	0.00024	0.07446	0.00003723
Total				**586**	**0.29**

Maximum H_2S PTE Estimates from Non-combusted Biogas

(105,000,000 scf/year) x (0.01 H_2S content) x (28.3 liter/scf) x (1 mole/24.245 liter @NTP) x (0.2 non-combusted H_2S) x (36 g/mole of H_2S) x (1 lb./454 g) x 1 ton/2000 lbs.) =
9.6 tons H_2S/year from non-combusted biogas

171,400 lbs. SO_2/year x 1 year/8760 hours =
2.2 lbs. H_2S/hour from non-combusted biogas

Toxic Air Pollutant Emissions from Biogas Combustion

Tables 4.0 and 5.0 provide a maximum PTE emissions of Non-carcinogenic and carcinogenic Toxic Air Pollutants from the combustion of biogas at the City of Burley IWTP. The emission estimates assume that the maximum design flow of biogas to the flare (1,000,000scf/day for 365 days per year) was combusted in one year and that these emissions occurred evenly over 8760 hours. Table 6.0 provides the calculations used to develop Tables 4.0 and 5.0. This will greatly over-estimate the actual level of emissions as previous biogas production data has shown that the typical annual biogas production is approximately 70 x 10^6 scf and not 365 x 10^6 scf as assumed in the tables. Emissions

Table 4.0. PRE- AND POST PROJECT NON-CARCINOGENIC TAP EMISSIONS SUMMARY

POTENTIAL TO EMIT

Non-Carcinogenic Toxic Air Pollutants (sum of all emissions)	Pre-Project 24-hour Average Emissions Rates for Units at the Facility (lb/hr)	Post Project 24-hour Average Emissions Rates for Units at the Facility (lb/hr)	Change in 24-hour Average Emissions Rates for Units at the Facility (lb/hr)	Non-Carcinogenic Screening Emission Level (lb/hr)	Exceeds Screening Level? (Y/N)
Barium Compounds	**0**	0.000015708	0.000015708	**0.033**	**No**
Chromium II & III Compounds	**0**	0.00004998	0.00004998	**0.033**	**No**
Cobalt	**0**	2.9988E-06	2.9988E-06	**0.033**	**No**
Copper (fume)	**0**	0.000030345	0.000030345	**0.013**	**No**
Dichlorobenzene	**0**	0.00004284	0.00004284	**20**	**No**
Hexane	**0**	0.06426	0.06426	**12**	**No**
Hydrogen Sulfide	**0**	0.000013566	0.000013566	**0.933**	**No**
Manganese	**0**	0.00003927	0.00003927	**0.067**	**No**
Molybdenum	**0**	0.000021777	0.000021777	**0.333**	**No**
Naphthalene	**0**	8.568E-07	8.568E-07	**3.33**	**No**
Selenium	**0**	0.00012138	0.00012138	**0.013**	**No**
Toluene	**0**	0.00008211	0.00008211	**25**	**No**
Vanadium	**0**	0.0010353	0.0010353	**0.003**	**No**
Zinc	**0**	0.000015708	0.000015708	**0.667**	**No**

Table 5.0. PRE- AND POST PROJECT CARCINOGENIC TAP EMISSIONS SUMMARY POTENTIAL TO EMIT

Carcinogenic Toxic Air Pollutants (sum of all emissions)	Pre-Project Annual Average Emissions Rates for Units at the Facility (lb/hr)	Post Project Annual Average Emissions Rates for Units at the Facility (lb/hr)	Change in Annual Average Emissions Rates for Units at the Facility (lb/hr)	Carcinogenic Screening Emission Level (lb/hr)	Exceeds Screening Level? (Y/N)
Arsenic Compounds	**0**	0.00000714	0.00000714	0.0000015	**No**
Benzene	**0**	0.00007497	0.00007497	0.0008	**No**
Beryllium Compounds	**0**	4.284E-07	4.284E-07	0.000028	**No**
Cadmium Compounds	**0**	0.00003927	0.00003927	0.0000037	**No**
Nickel	**0**	0.00007497	0.00007497	0.000027	**No**
POM	**0**	3.1416E-06	3.1416E-06	0.000002	**No**

Table 6.0. Calculations for Tables 4.0 and 5.0

Toxic Air Pollutant	Max. Hourly Biogas combustion volume (10^6 scf/hour)	Methane Content	AP-42 Emission Factor lbs./10^6 scf of biogas	Max Emissions lbs./hour	EL (lb/hour)	Exceeds EL?
Barium	0.042	0.85	0.00044	0.000015708	0.033	No
Chromium III	0.042	0.85	0.0014	0.00004998	0.033	No
Cobalt	0.042	0.85	0.000084	2.9988E-06	0.0033	No
Copper	0.042	0.85	0.00085	0.000030345	0.013	No
Dichlorobenzene	0.042	0.85	0.0012	0.00004284	20	No
Hexane	0.042	0.85	1.8	0.06426	12	No
Manganese	0.042	0.85	0.00038	0.000013566	0.067	No
Molybdenum	0.042	0.85	0.0011	0.00003927	0.333	No
Naphthalene	0.042	0.85	0.00061	0.000021777	3.33	No
Selenium	0.042	0.85	0.000024	8.568E-07	0.013	No
Toluene	0.042	0.85	0.0034	0.00012138	25	No
Vanadium	0.042	0.85	0.0023	0.00008211	0.003	No
Zinc	0.042	0.85	0.029	0.0010353	0.667	No
Arsenic	0.042	0.85	0.0002	0.00000714	0.0000015	No
Benzene	0.042	0.85	0.0021	0.00007497	0.0008	No
Beryllium	0.042	0.85	0.000012	4.284E-07	0.000028	No
Cadmium	0.042	0.85	0.0011	0.00003927	0.0000037	No
Nickel	0.042	0.85	0.0021	0.00007497	0.000027	No
POM	0.042	0.85	0.000088	3.1416E-06	0.000002	No

Maximum H_2S PTE Estimates from Non-combusted Biogas

(105,000,000 scf/year) x (0.01 H_2S content) x (28.3 liter/scf) x (1 mole/24.245 liter @NTP) x (0.2 non-combusted H_2S) x (36 g/mole of H_2S) x (1 lb./454 g) x 1 ton/2000 lbs.) =

9.6 tons H_2S/year from non-combusted biogas

171,400 lbs. SO_2/year x 1 year/8760 hours =
2.2 lbs. H_2S/hour from non-combusted biogas

H_2S EL = 0.933 lb/hour. Estimated maximum H_2S emissions exceed the EL.

ANALYTICAL REPORT

Report Date: October 26, 2016

Frank DeRosso
RMEC, Inc.
785 North 400 West
Salt Lake City, UT 84103

Phone: (801) 467-3661
Fax: (801) 583-1463
E-mail: fderosso@rmec.net

Workorder: **34-1629432**
Project ID: 16E-3190/Burley IWTP 101916
Purchase Order: 16E-3190
Project Manager Kevin W. Griffiths

Client Sample ID	Lab ID	Collect Date	Receive Date	Sampling Site
Biogas-01	1629432001	10/19/16	10/19/16	Burley IWTP
Biogas-02	1629432002	10/19/16	10/19/16	Burley IWTP

ANALYTICAL REPORT

Workorder: 34-1629432
Client: RMEC, Inc.
Project Manager: Kevin W. Griffiths

Analytical Results

Sample ID: **Biogas-01** | Sampling Site: Burley IWTP | Collected: 10/19/2016
Lab ID: 1629432001 | Media: Summa 6 Liter Canister | Received: 10/19/2016
Matrix: Air | Sampling Parameter: Air Volume 6 L

Analysis Method - ASTM D5504

Preparation: Not Applicable | **Analysis:** ASTM D5504, Air | **Instrument ID:** GCE27
Batch: ISCD/1626 (HBN: 178857) | **Percent Solid:** NA
Analyzed: 10/20/2016 13:55 | **Report Basis:** Wet

Analyte	Result (ppm)	RL (ppm)	Dilution	Qual
Hydrogen sulfide	**11000**	180	25000	

Analysis Method - Light Hydrocarbons by GC-FID

Preparation: Not Applicable | **Analysis:** Light Hydrocarbons by GC-FID, Air | **Instrument ID:** GCI15
Batch: EGC/6553 (HBN: 179053) | **Percent Solid:** NA
Analyzed: 10/24/2016 15:08 | **Report Basis:** Wet

Analyte	Result (ppm)	RL (ppm)	Dilution	Qual
Methane	**930000**	1000	100	
Ethylene	<500	500	100	
Ethane	<500	500	100	
Propene	<500	500	100	
Propane	<500	500	100	
Isobutane	<500	500	100	
n-Butane	<500	500	100	
Isopentane	<500	500	100	
Pentane	<500	500	100	

Sample ID: **Biogas-02** | Sampling Site: Burley IWTP | Collected: 10/19/2016
Lab ID: 1629432002 | Media: Summa 6 Liter Canister | Received: 10/19/2016
Matrix: Air | Sampling Parameter: Air Volume 6 L

Analysis Method - ASTM D5504

Preparation: Not Applicable | **Analysis:** ASTM D5504, Air | **Instrument ID:** GCE27
Batch: ISCD/1626 (HBN: 178857) | **Percent Solid:** NA
Analyzed: 10/20/2016 14:04 | **Report Basis:** Wet

Analyte	Result (ppm)	RL (ppm)	Dilution	Qual
Hydrogen sulfide	**8300**	180	25000	

Analysis Method - Light Hydrocarbons by GC-FID

Preparation: Not Applicable | **Analysis:** Light Hydrocarbons by GC-FID, Air | **Instrument ID:** GCI15
Batch: EGC/6553 (HBN: 179053) | **Percent Solid:** NA
Analyzed: 10/24/2016 15:40 | **Report Basis:** Wet

Analyte	Result (ppm)	RL (ppm)	Dilution	Qual
Methane	**770000**	1000	100	
Ethylene	<500	500	100	
Ethane	<500	500	100	
Propene	<500	500	100	
Propane	<500	500	100	
Isobutane	<500	500	100	

Results Continued on Next Page

ANALYTICAL REPORT

Workorder: 34-1629432
Client: RMEC, Inc.
Project Manager: Kevin W. Griffiths

Analytical Results

Sample ID: **Biogas-02**	Sampling Site: Burley IWTP	Collected: 10/19/2016
Lab ID: 1629432002	Media: Summa 6 Liter Canister	Received: 10/19/2016
Matrix: Air	Sampling Parameter: Air Volume 6 L	

Analysis Method - Light Hydrocarbons by GC-FID

Preparation: Not Applicable	**Analysis:** Light Hydrocarbons by GC-FID, Air	**Instrument ID:** GCI15
	Batch: EGC/6553 (HBN: 179053)	**Percent Solid:** NA
	Analyzed: 10/24/2016 15:40	**Report Basis:** Wet

Analyte	Result (ppm)	RL (ppm)	Dilution	Qual
n-Butane	<500	500	100	
Isopentane	<500	500	100	
Pentane	<500	500	100	

Comments

Quality Control: Light Hydrocarbons by GC-FID - (HBN: 179053)

Due to the unavailability of standards, these samples were analyzed using expired standards. Standards will be verified when new standards are available and clients notified if there are any issues with the expired standa

Report Authorization (/S/ is an electronic signature that complies with 21 CFR Part 11)

Method	Analyst	Peer Review
ASTM D5504	/S/ Steven J. Sagers 10/24/2016 14:29	/S/ Lyle Edwards 10/21/2016 15:46
Light Hydrocarbons by GC-FID	/S/ Steven J. Sagers 10/26/2016 09:53	/S/ Lyle Edwards 10/26/2016 12:39

Laboratory Contact Information

ALS Environmental
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Salt Lake City, Utah 84123

Phone: (801) 266-7700
Email: alslt.lab@ALSGlobal.com
Web: www.alsslc.com

ANALYTICAL REPORT

Workorder: 34-1629432
Client: RMEC, Inc.
Project Manager: Kevin W. Griffiths

General Lab Comments

The results provided in this report relate only to the items tested.
Samples were received in acceptable condition unless otherwise noted.
Samples have not been blank corrected unless otherwise noted.
This test report shall not be reproduced, except in full, without written approval of ALS.

ALS provides professional analytical services for all samples submitted. ALS is not in a position to interpret the data and assumes no responsibility for the quality of the samples submitted.

All quality control samples processed with the samples in this report yielded acceptable results unless otherwise noted.

ALS is accredited for specific fields of testing (scopes) in the following testing sectors. The quality system implemented at ALS conforms to accreditation requirements and is applied to all analytical testing performed by ALS. The following table lists testing sector, accreditation body, accreditation number and website. Please contact these accrediting bodies or your ALS project manager for the current scope of accreditation that applies to your analytical testing.

Testing Sector	Accreditation Body (Standard)	Certificate Number	Website
Environmental	ANAB (DoD ELAP)	ADE-1420	http://www.anab.org/accredited-organizations/
	Utah (NELAC)	DATA1	http://health.utah.gov/lab/labimp/
	Nevada	UT00009	http://ndep.nv.gov/bsdw/labservice.htm
	Oklahoma	UT00009	http://www.deq.state.ok.us/CSDnew/
	Iowa	IA# 376	http://www.iowadnr.gov/InsideDNR/RegulatoryWater.aspx
	Texas (TNI)	T104704456-11-1	http://www.tceq.texas.gov/field/qa/lab_accred_certif.html
	Washington	C596-16	http://www.ecy.wa.gov/programs/eap/labs/index.html
	Kansas	E-10416	http://www.kdheks.gov/lipo/index.html
Industrial Hygiene	AIHA LAP LLC (ISO 17025 & IHLAP/ELLAP)	101574	http://www.aihaaccreditedlabs.org
	Washington	C596-16	http://www.ecy.wa.gov/programs/eap/labs/index.html
Lead Testing:			
CPSC	ANAB (ISO 17025, CPSC)	ADE-1420	http://www.anab.org/accredited-organizations/
Soil, Dust, Paint ,Air	AIHA LAP LLC (ISO 17025 & IHLAP/ELLAP)	101574	http://www.aihaaccreditedlabs.org
Dietary Supplements	ACLASS (ISO 17025)	ADE-1420	http://www.aclasscorp.com

Result Symbol Definitions

MDL = Method Detection Limit, a statistical estimate of method/media/instrument sensitivity.
RL = Reporting Limit, a verified value of method/media/instrument sensitivity.
CRDL = Contract Required Detection Limit
Reg. Limit = Regulatory Limit.
ND = Not Detected, testing result not detected above the MDL or RL.
< This testing result is less than the numerical value.
** No result could be reported, see sample comments for details.

Qualifier Symbol Definitions

U = Qualifier indicates that the analyte was not detected above the MDL.
J = Qualifier Indicates that the analyte value is between the MDL and the RL. It is also used to indicate an estimated value for tentatively identified compounds in mass spectrometry where a 1:1 response is assumed.
B = Qualifier indicates that the analyte was detected in the blank.
E = Qualifier indicates that the analyte result exceeds calibration range.
P = Qualifier indicates that the RPD between the two columns is greater than 40%.

APPENDIX B – FACILITY DRAFT COMMENTS

The following comments were received from the facility on February 6 and 23, 2017:

Facility Comment No. 1: Regarding Permit Condition 2.14.1, it is unclear to me if a performance test needs to be performed to cover the two new dischargers that were added to the digester. RMEC performed basic testing of the biogas stream to measure H_2S content and then performed SO_2 emission estimates based on the measured H2S concentration, measured biogas flow to the flare and assuming an 80 % conversion of the H_2S to SO_2. Does this satisfy the performance test requirement for the two new dischargers?

Facility Comment No. 2: I have a comment about the permit that I'd like to see addressed along with the things that Frank was concerned with. The city would like to have a compliance schedule included that gives us time to come into compliance with the new permit. I have a new flare on order and along with a few other parts that need to be purchased and installed it may take up to a year to get to the point that we can meet the new permit requirements. It really shouldn't take that long however if we do have to go through the bidding process to get the equipment, it does take a substantial amount of time. It is also reasonable to assume that purchasing new equipment can take a long time to get.

DEQ Response: Because these are compliance related comments, DEQ Twin Falls Regional Office will be a point of contact to address these issues. DEQ source test reviewing group and permitting group would be supporitng teams for the regional office for compliance issues.

APPENDIX C – PROCESSING FEE

N Does this facility qualify for a general permit (i.e. concrete batch plant, hot-mix asphalt plant)? Y/N

Y Did this permit require engineering analysis? Y/N

N Is this a PSD permit Y/N (IDAPA 58.01.01.205.04)

Emissions Inventory			
Pollutant	Annual Emissions Increase (T/yr)	Annual Emissions Reduction (T/yr)	Annual Emissions Change (T/yr)
NO_X	0.0	0	0.0
SO_2	0.0	0	0.0
CO	0.0	0	0.0
PM10	0.0	0	0.0
VOC	0.0	0	0.0
TAPS/HAPS	0.0	0	0.0
Total:	0.0	0	**0.0**
Fee Due	**$1,000.00**		